

Title (en)  
SEMICONDUCTOR SUBSTRATE

Title (de)  
HALBLEITERSUBSTRAT

Title (fr)  
SUBSTRAT SEMI-CONDUCTEUR

Publication  
**EP 3550591 A4 20200805 (EN)**

Application  
**EP 17877266 A 20171128**

Priority  
• JP 2016231901 A 20161130  
• JP 2017042694 W 20171128

Abstract (en)  
[origin: EP3550591A1] A semiconductor wafer is provided, which has a buffer layer having a stacked structure in which first crystal layers formed of AlGa<sub>N</sub> and second crystal layers formed of AlGa<sub>N</sub> are repeatedly stacked, where when TEM observation of a cross-section of the buffer layer is performed at an observation region including one of the first crystal layers, HAADF-STEM intensity I(D) being a function of a depth D takes a local minimum value I<sub>min</sub> at a depth D<sub>min</sub> and takes a local maximum value I<sub>max</sub> at a depth D<sub>max</sub> (D<sub>max</sub> > D<sub>min</sub>), and a depth direction distance DD1 from a depth at which the I(D) takes an intermediate value I<sub>mid</sub> of the I<sub>max</sub> and the I<sub>min</sub> to a depth at which the I(D) takes the I<sub>min</sub> in a monotonous decrease region disposed shallower than the D<sub>min</sub>, and a depth direction distance DD2 from a depth at which the I(D) takes the I<sub>min</sub> to a depth at which the I(D) takes the I<sub>max</sub> in a monotonous increase region disposed deeper than the D<sub>min</sub> satisfy a condition that  $DD1 \leq 0.3 \times DD2$ .

IPC 8 full level  
**H01L 21/205** (2006.01); **C23C 16/30** (2006.01); **C23C 16/34** (2006.01); **G01N 23/04** (2018.01); **G01N 23/20058** (2018.01); **H01L 21/02** (2006.01); **H01L 21/338** (2006.01); **H01L 29/778** (2006.01); **H01L 29/812** (2006.01)

CPC (source: EP US)  
**C23C 16/30** (2013.01 - EP US); **C23C 16/34** (2013.01 - EP US); **H01L 21/02381** (2013.01 - EP US); **H01L 21/02458** (2013.01 - EP US); **H01L 21/02505** (2013.01 - EP US); **H01L 21/02507** (2013.01 - EP US); **H01L 21/0254** (2013.01 - EP US); **H01L 21/0262** (2013.01 - EP US); **H01L 29/2003** (2013.01 - US); **H01L 29/205** (2013.01 - US); **H01L 29/778** (2013.01 - EP US); **H01L 29/812** (2013.01 - EP US); **H01L 29/7786** (2013.01 - US)

Citation (search report)  
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• [XI] G. DEVARAJU ET AL: "Ion-beam-treated strained AlGa<sub>N</sub>/Ga<sub>N</sub> multi-quantum wells: HAADF-STEM, HRTEM, Raman and HRXRD characterizations", RADIATION EFFECTS AND DEFECTS IN SOLIDS, vol. 167, no. 8, August 2012 (2012-08-01), GB, pages 612 - 620, XP055705679, ISSN: 1042-0150, DOI: 10.1080/10420150.2011.642872  
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